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ABSTRACT

This paper reports on a pilot study designed to investigate how regulating group size or social density, in the form of peer-dyad intervention, may contribute to peer interaction in children who have severe language disorders. Subjects were five males and one female ranging in age from 42-48 months all of whom had a severe developmental delay in all areas of language acquisition as well as a lack of social-pragmatic behaviors. Subjects were paired in three dyads and observed over a 6-month period in both their dyads and whole group for the frequency of several categories of nonverbal interactional behavior including initiating, imitative, and reciprocal behaviors. Of the 480 minutes of observation data, subjects engaged in non-interactional behavior for a total of 307 minutes. A total of 1,160 events of interactional behavior were observed. Of that, 322 events occurred in the whole group context and 838 in the peer-dyad context. The frequency of interactional behavior over the eight observation periods followed a complementary pattern, increasing and decreasing in frequency in a reciprocal fashion. Results support the value of the peer-dyad for the development of interactional behavior for the language impaired child. Contains 23 references. (DB)

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Language Services for Severely Impaired Preschoolers: Addressing some assumptions related to individual therapy versus social integration in groups

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Abstract

The debate continues on the most effective intervention model for providing language development services to young handicapped children. Those who support l:l therapy cite the need for extensive direct teaching in a personalized context. Those concerned with generalization of social knowledge learned through therapy experiences point to the unrealistic nature of l:l adult-child contacts in the "real world" of school peer interaction. Consequently, group experiences are advocated in which language development is incorporated into the classroom curriculum.

This paper reports on a pilot study designed to investigate how regulating group size or social density, in the form of a peer-dyad intervention, may contribute to peer interaction in children who have severe language disorders. The pilot study explores the relationship between levels of peer interaction and levels of social density, and makes some recommendation for implementation within the early childhood special education setting.

Introduction

The debate continues on the most effective intervention model for providing language development services to young handicapped children. Those who support 1:1 therapy cite the need for extensive direct teaching in a personalized context. Those concerned with generalization of social knowledge learned through therapy experiences point to the unrealistic nature of 1:1 adult-child contacts in the "real world" of school peer interaction. Consequently, group experiences are advocated in which language development is incorporated into the classroom curriculum (Bernstein & Tiegerman, 1989; Latham, 1987; McEvoy, Nordquist et al, 1988; Strain, Hoyson, & Jamieson, 1985).

This paper reports on a pilot study designed to investigate how regulating group size or social density in the form of a peer-dyad intervention, may contribute to peer interaction in children who have severe language disorders. The pilot study explores the relationship between levels of peer interaction and levels of social density, and makes some recommendation for implementation within the early childhood special education setting

Review of the Literature

Many studies of children in high-and-low density settings have been conducted, in an attempt to assess whether *density aspects* have adverse effects on behavior. Density is usually defined in terms of number of square feet per child, with low densities providing 2 to 5 times more space than high densities. Increased density appears to have a moderate effect upon children, most notably in their social behaviors (Liddell & Kruger, 1987; Loo, 1972; Smith & Connolly, 1980). Smith and Connolly (1980) made a distinction between variations in *social density,* the number of persons in a room is varied, and *spatial density*, the size of the room is varied. For both, *resource availability*, the number of toys and pieces of play materials, may also be manipulated to determine effects upon social behavior in young children.

Such distinctions enabled Smith and Connolly (1980) to establish a direct relationship between increased spatial density and lower levels of social participation, with a threshold of *crowding,* located between 15 and 25 square feet per child, beyond which adverse effects in social behavior were considerably more marked. *Crowding* is, and continues to be, one of the few density variables routinely investigated in terms of its effect upon social behavior in young children. Yet if *crowding* does not exist in a given setting, are there other density factors which could contribute to variations in social behavior. There is not adequate information on what may happen to children, outside of settings involving environmental extremes, such as *crowding.*

Related to the spatial density variables is the construct of *social density,* often explored in terms of *student-teacher ratio. Student-teacher ratio* is defined as the number of students to the number of teachers in a given setting. Although numerous studies have been conducted to examine the effects of different *student-teacher ratios* in general education settings, only recently has some attention been given to the effects of varying *student-teacher ratios* in special education settings. (Alberto, Jobes, Sizemore, & Doren, 1980; Snart & Hillyard, 1985; Thurlow, 1989). Outcome valuables in these studies, unlike those investigated in relationship to *crowding*, most often focus upon student achievement testing and not upon variations in social behavior.

For both general and special education settings, researchers advocate the size of classroom groups and ratio of adults to children be *carefully regulated* to allow active involvement of children, and time for teachers both to work with individuals and to coordinate with teams of specialists. (Alberto, Jobes, Sizemore, & Doren, 1980; Snart & Hilyard, 1985; Thurlow, 1989). How each of these teacher related tasks can be accomplished effectively is not clear from the existing research. The effect of *social density* upon the function of organizational and educational systems remains understudied in terms of its potential effect upon social behavior in young children.

Educationally based intervention for language disordered young children, in particular, has traditionally reflected two polarized *social density* levels or *student-teacher ratios:* low social density or 1:1 *student-teacher* ratio and high social density or 6:1 *student-teacher* ratio. The effective use of either density level, in isolation, is questionable. A more realistic perspective is a service model that emphasizes interaction among social density components (Bernstein & Tiegerman, 1989; Handleman, Powers, & Harris, 1983; Tryon & Keane, 1986).

The majority of language disordered children not only show deficits in linguistic knowledge; but they have equally severe deficits in pragmatics or social language functions. Speech-language pathologists are familiar with this phenomenon as it relates to problems of "carry-over" in language disordered children. Although new social/linguistic skills may be demonstrated in a therapy room, when children return to more natural social contexts, such as the classroom, they have a strong tendency to return to old patterns of initiating and responding in communicative exchanges. They are unable to generalize learning from one communication and *social density* level to another. Intervention for language disordered young children needs to include conscious elements designed to reduce the influence of this seemingly "natural resistance" to language generalization and integration (Bernstein & Tiegerman, 1989; Handleman, Powers, & Harris, 1983; Tryon & Keane, 1986).

Children with language disorders have benefited from research interventions that involve the modeling of one other peer. Some interventions have helped language disordered children to imitate appropriate social behaviors and use skills learned during peer sessions in other contexts. Peers may be one of the best choices for social training agents as interaction with peers is a primary goal for language disordered children. In addition, much child development literature indicates that children, regardless of handicap, exert a powerful influence upon each other's behavior (Odom & Strain, 1986; Strain & Powell, 1981; Tryon & Keane, 1986).

Professionals who perform individualized assessment and those engaged in experimental analysis are now rethinking their approaches to studying the ways in which language disordered children learn social/linguistic skills in varied settings (Koegel, Dell, & Koegel, 1987; Monteiro, Nelson, & Turner, 1987). Theorists and researchers have often behaved as if varied social context were the enemy of understanding rather than a resource for gaining insight into how language disordered children can learn social/linguistic skills for use in their everyday lives. (Koegel, Dell & Koegel, 1987; McEvoy, Nordquist et al, 1988). Although they are almost exclusively utilized in the educational setting, the traditional 1:1 or 6:1 student-teacher ratios are not the only appropriate groupings in which language disordered children can receive language intervention services. Experimental research has indicated that intervention in a 2:1 setting, with a pair of children and a therapist may also be effective when dealing with language disordered children (Odom & Strain, 1986; Strain & Powell, 1981; Tryon & Keane, 1986).

Research on the effectiveness of one traditional intervention model (low density/1:1 student-teacher ratio) over the alternative (high density/6:1 student-teacher ratio) or visa versa is also inconclusive. What is presently needed is an educational model that encourages a broad spectrum and variety of social/linguistic interactions, similar to that experienced in ordinary community life. The arbitrary placement of language disordered children in a either a 1:1 or 6:1 intervention setting may not adequately address their individual social needs, pragmatic deficits, or provide educational experiences which specifically facilitate peer interaction.

This pilot study explored the effects a peer-dyad, 2:1 intervention, could potentially have upon language disordered preschoolers' utilization of interactional behavior in the classroom setting. It was hypothesized that since the dyad is the basic unit of communication (Bloom & Lahey, 1978), it was logical to use this basic unit as a primary intervention strategy. Although at least one study, in particular, associates adult-child interactions with competence in future social interactions with peers (Baumrind, 1977), other studies indicate that early peer interactions may, in fact, be qualitatively different from similar attachments young children may form with older children, siblings, or adults (Becker, 1977; Mueller & Brenner, 1977; Vandell, 1979; Young & Lewis, 1979). Thus, early peer interactional behavior, while recognized as an emerging property of former and ongoing interactions with adults, may, in fact, reflect a unique set of social patterns not necessarily demonstrated during adult-child 1:1 intervention strategies. Accordingly, peer dyad interventions could prove a vital treatment measure when addressing the problems of "carry over" in the language disordered children previously described. Without specific peer social modeling in the peer dyad intervention, appropriate peer interactions in the larger context of the classroom may not appear.

Subjects

All subjects had been enrolled at an early intervention center for language disordered children for a one year period. Each dyad had been in a self contained classroom with a 6:1 student-teacher ratio and all children had received a 1:1 speech-language intervention twice a week for two thirty minutes sessions. All individual dyad pairs were in the same classroom, but no two dyads were together.

Five males and one female, with a median age of 45 months were observed. Children ranged in age from 42-48 months and were white middle class children, whose social economic status ranged from working class to professional. Prior to selection for observation, each child had been assessed by a transdisciplinary early intervention team of professionals. Their assessment profile revealed children whose present level of performance was characterized by a severe developmental delay of at least 15 months in all areas of language acquisition, with a marked absence of social-pragmatic behaviors. Testing used to ascertain this language profile included: Peabody Picture Vocabulary Test, Preschool Language Scale, Receptive-Expressive Emergent Language Scale, Expressive One Word Picture Vocabulary Test, Test of Auditory Comprehension of Language, and the Test of Pragmatics.

An ecological approach, which focuses upon naturally occurring behaviors was used for this pilot so that information collected would closely simulate the average educational setting . Every attempt was made for the peer-dyad intervention to remain as normal a condition as possible for each of the children.

Each child was paired with another, matched closely for level of social functioning, to form three peer dyads. Each of the dyads was sampled alternately over a six month period for ten minute video observations in a 2:1 peer-dyad intervention with a new therapist and in the classroom with their regular teacher and peers. Individual speech-language therapy was continued for each child but was not sampled. As all subjects possessed a severely limited linguistic corpus, one child being completely nonverbal, and were at a presyntactic stage of development, subjects were observed in terms of the frequency of several categories of *nonverbal interactional behavior.*

When the patterns of two children are contingent upon one another, the children may be said to be engaged in *interactional behavior.* A recent study reports that one of the most reliable patterns of social behavior in young children involves the exchange of visual regard (Jacobson, 1981). *Interactional behavior*, then, in terms of the present pilot study, was always a set of behaviors preceded or followed by a gaze at the peer. These interactional behaviors were further categorized in terms of *initiating, imitative, or reciprocal* behavior to operate as *dependent variables* for the study.

The following definitions applied to the previously designated dependent variables.

Dependent Variables	Definition
Initiating Behavior	An initiating behavior is any interactional behavior that occurs after a five-second period in which no interactional behavior occurs. eg. child looks at peer and places hand on partner's arm, as a starting behavior.
Imitative Behavior	An imitative behavior is an exact duplication of an immediately previous interactional behavior. This behavior must occur within five seconds of the previously emitted behavior. eg child looks at peer, observes him run across the room, and then runs himself.
Reciprocal Behavior	A reciprocal behavior is any nonimitative interactional behavior that occurs in response to any other interactional behavior. This behavior must occur within five seconds of the previously emitted behavior. eg. child observes peer wave to him from across the room and runs over to hug him.

Forty-eight pieces of data were collected via videotape; eight samples in the 2:1 peer-dyad intervention and eight in the 6:1 classroom setting, sixteen pieces of data in all for each peer dyad. These data were then analyzed by two trained observers to determine:

1) the frequency of interactional behaviors occurring during each set of observations.

2) Whether there was a relationship between the levels of interactional behavior in the 2:1 peer-dyad intervention and the 6:1 classroom intervention.

Data Collection

During the one-month period prior to data collection, one of the authors regularly visited the peer dyads, both in their 2:1 peer-dyad intervention and in the 6:1 classroom setting. During the regularly scheduled visits, she observed and interacted with the children and videotaped intermittently in order that the subjects become comfortable in her presence.This preliminary period also enabled subjects to become adjusted to their new therapist before *real* data was collected. None of the preliminary recording was further analyzed. Therapists were not advised as to when *real* data began to be collected. This measure prevented therapists from changing their sets of interactions once they realized actual data was being collected.

Each of the three dyads were video taped by the same author for eight ten-minute periods in each of the intervention settings. This videotaping was conducted every three weeks for a six month period. Forty-eight ten-minute videotaped sets of data were collected, yielding a total of 480 minutes of videotaped interactions. All analyses were derived from this videotape record.

Procedure

Individual dyads were led from their classroom to the setting for their 2:1 intervention by their *peer-dyad* therapist. The *peer-dyad* therapists were not given specific training procedures other than "to utilize methods they would ordinarily use to help children increase interaction with one another." The lack of specific training procedures allowed for the collection of ecologically based, normally occurring sets of interactions. * The author would then run the video camera for the stipulated ten-minute period.

*The criterion for commencement of videotaping was that each dyad member be in a quiet, alert state for ten minutes.

The week following the *peer-dyad* intervention taping, individual dyads were taped in their classrooms with their regular teacher. Limited training procedures and criterion for commencement of video taping remained the same as for the peer-dyad intervention taping. If approached by a child during either taping session the author responded naturally but briefly.

Recorder Training

The first step in the training process was to acquaint the observers who were recording the interactional behaviors with the forms used for observation. A brief and precise definition of each behavior to be recorded was included on a separate instruction sheet. The author-trainer then queried the observers on basic definitions to ensure mastery.

The second step in their training process involved making several videotape recordings similar to those to be observed in the study. Training sessions were then conducted in which these videotapes were replayed, stopping the recording each time one of the behaviors to be recorded occurred. The author-trainer then called the observers' attention to this behavior and discussed specifically why this event fitted the definition of the behavior in question.

The next step involved setting up a number of practice observations in which the author-trainer began to determine how accurately the observers could independently record what they had seen. The author-trainer recorded data from a two-minute segment of videotape. She then gave this videotape to the observers to record on the observation forms. Once the observers completed their recording, the author checked to determine if the target behaviors had been recorded correctly. If the recordings of the observers and the author-trainer disagreed, the author-trainer replayed the videotape, stopping at each behavior to explain how it should have been recorded and why. This process of practice and feedback was repeated with different videotape segments until 80%, the desired level of agreement was reached.

As the observers gained expertise with short videotape segments, videotape segments were lengthened until, at the latter phase of training, the observers were recording data for periods which equaled the ten minute observations that were conducted in the study. The average percentage of interrater reliability for all dependent variables was .85. The range of agreement across variables was .81 - .90. Once the observers were trained to a desired level of reliability and accuracy, recording of real data began.

Data Analysis

The total interactional behaviors were event sampled for each of their 10-minute observations.

Each 10-minute observation was viewed as a 600-second segment, in which there were 60 ten-second segments in which to record *interactional behavior.* Any single initiation, imitation, or reciprocation was recorded as one event.

Within for example, twelve 10-second segments, ie. 2 minutes, there could be one *initiation,*, followed by an *imitation,* and two *reciprocal* exchanges; a fifteen second interval, in which there is no interactional behavior, followed by a second *initiation,* and no *reciprocation.* The *frequency of interactional behavior* for these twelve segments would be recorded as:

- 2 initiations
- 1 imitation
- 2 reciprocations

In the 6:1 context, interactional behavior included any cited behavior that occurred between either individual peer-dyad member and any other child, as well as those behaviors that occurred between dyad members. Only behaviors that occurred between children were counted. Interactional behavior occurring between adults and children was not recorded.

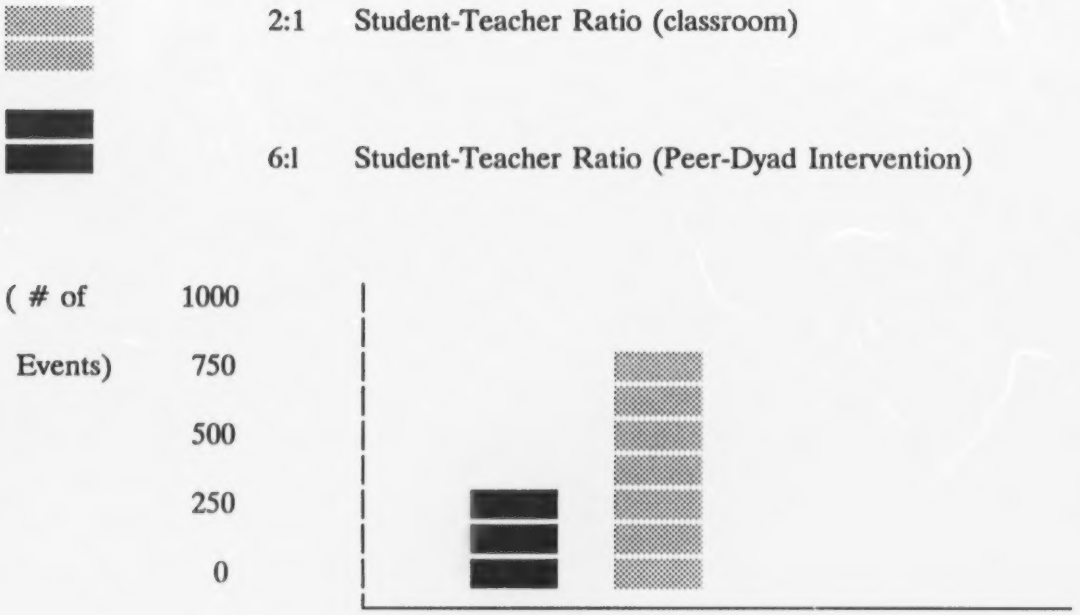
Findings

A total of 480 minutes of observation was sampled; 240 minutes in the 6:1 density context and 240 in the 2:1 density context. The subjects were engaged in *non-interactional behavior* for a total of 307 minutes. During the remaining 173 minutes, children were engaged in some form of *interactional behavior.* In total, 1, 160 events of interactional behavior were observed. Of that, 322 events of interactional behavior occurred in the 6:1 classroom context and 838 in the 2:1 peer-dyad context. (See Table 1).

Of the total events, 544 were initiations, 136 were imitations, and 411 were reciprocations. Of the 6:1 density events, 167 were initiations, 17 were imitations, and 138 Ywere reciprocations. Of the 2:1 density events, 426 were initiations, 98 were imitations, and 314 were reciprocations.

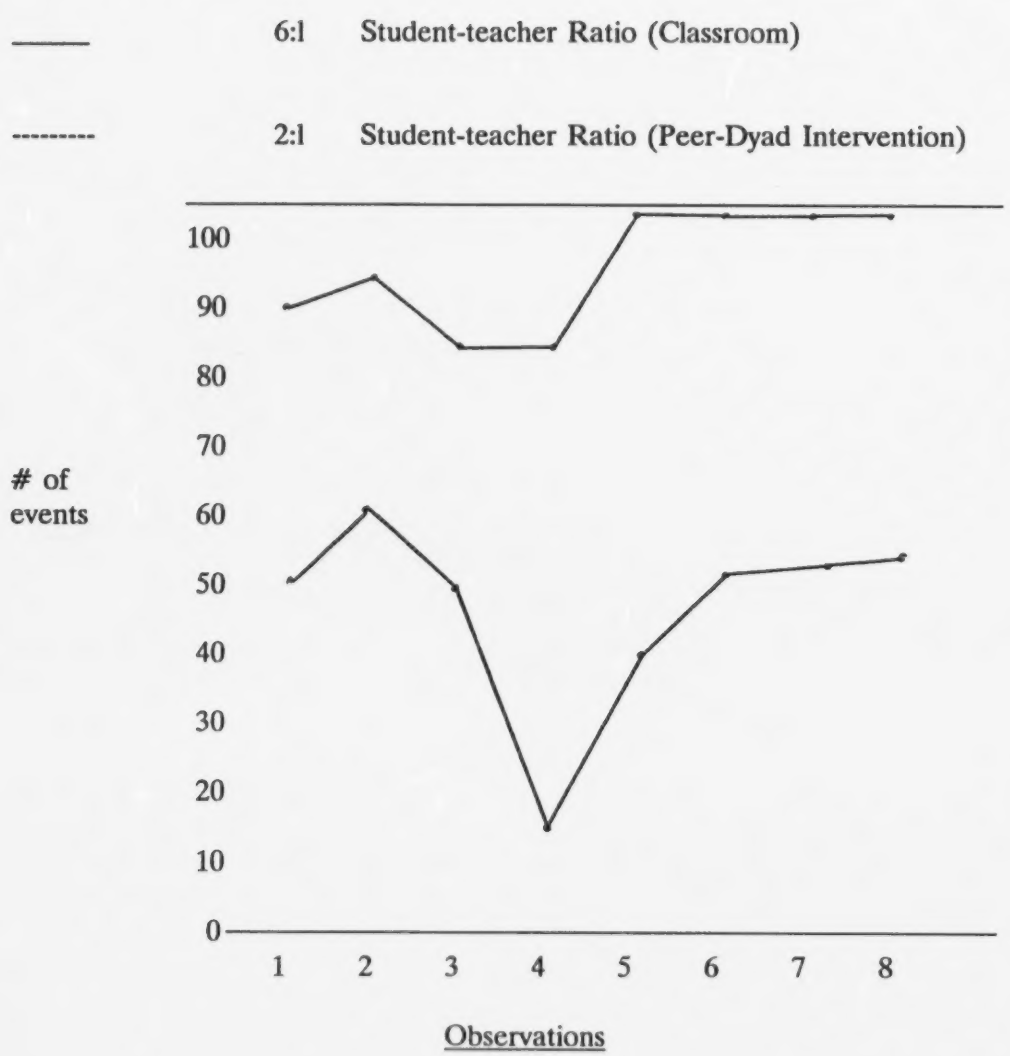
The frequency of interactional behavior over the eight-time observation period (6 months in duration) followed a complementary pattern, increasing and decreasing in frequency in a reciprocal fashion. Each series of events began at a given frequency, decreased midway through scheduled observations, and then increased to a frequency greater than initially observed (See Table 2).

Table 1



Total Interactional Behavior
(# of events)

Table 2


6:1 Student-teacher Ratio (Classroom)
2:1 Student-teacher Ratio (Peer-Dyad Intervention)
# of events
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
Observations

Discussion

The present study investigated the relationship between interactional behavior and social density for six language impaired preschool children. Interaction is a function of many variables,social density playing a role in its development. Obviously, children need communication partners for interaction to result. However, the data collected in the present pilot study may indicate that if there are too many potential communication partners available, particularly in the case of the language impaired child, potential interaction may be depressed.

The authors recognize the limits of their pilot study. In order to highlight differentials between density levels, frequency of interactional events was emphasized in lieu of patterns of interaction. Because neither a similar study was conducted with normally developing language learners, nor a control group of language impaired children was observed, it is difficult to ascertain the relationships between and among normal interactional development, impaired interactional development, and social density ie., would normally developing language learners interact less in the classroom than in a peer-dyad or is this observation purely a function of being language impaired ? What would the frequency of classroom interaction have been after six months of observations for language impaired children who had no peer dyad intervention? Obviously, these are questions worthy of further investigation.

Some explanation can be offered in terms of the reciprocal patterning of interaction over the eight observations. Although the nature of this relationship is not clear from this pilot study, there does appear to be a relationship between the frequency of interactional events in each context. Whether this relationship reflects a generalization of interactional skill cannot be confirmed from the existing data.

Normal language learners have the pragmatic skills to initiate, terminate, and regulate the language behavior of their peers. If a child has severe deficits in social language learning, he is not able to structure the dynamics of his social experience (Bernstein & Tiegerman, 1989). Information from the present study indicates that use of these pragmatic interactional skills was more apparent in the peer-dyad 2:1 setting. The greater number of children in the classroom 6:1 context apparently contributed to a decrease in interactional events for the observed children.

In general, lack of attention to social density may account for some of the problems related to "carry-over" from the language therapy session to classroom setting, for language disordered children. If one wants to support interactional skills, one needs to develop means to address the basic unit of human contact found in the classroom; that is the child: child or peer dyad interaction.

The placement of language disordered children in groupings small relative to the mainstream setting may not, in and of itself, insure the development of appropriate interactional behavior between peers. Unless so structured, the average 6:1 special education placement may not address individual social needs in language disordered children with pragmatic deficits or provide a transitional social sequence which facilitates peer interaction.

Teachers may need to take additional intervention measures, such as use of the peer-dyad, to insure the development of interactional behavior for the language impaired child. These measures may include more modeling appropriate social behavior, sitting with two children, talking to one and demonstrating to the second, for example, how to request more clay or juice etc; and keeping children in dyads to stimulate adequate interactional behavior before they are asked to participate in larger groups. The beginning of the school year could consist of dyad or triad grouping while gradually integrating into groups of 6 or 12 by the end of the school year. For the language disordered child, social peer interaction may need to be gradually facilitated beginning with the peer dyad.

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